1: FEBS Lett 2002 Dec 18;532(3):279-82 Related Articles, Links

Introduction of a Na+/H+ antiporter gene from Atriplex gmelini confers salt tolerance to rice.

Ohta M, Hayashi Y, Nakashima A, Hamada A, Tanaka A, Nakamura T, Hayakawa T.

Plantech Research Institute, 1000 Kamoshida-cho, Aoba-ku, Yokohama, 227-0033, Kanagawa, Japan.

We engineered a salt-sensitive rice cultivar (Oryza sativa cv. Kinuhikari) to express a vacuolar-type Na+/H+ antiporter gene from a halophytic plant, Atriplex gmelini (AgNHX1). The activity of the vacuolar-type Na+/H+ antiporter in the transgenic rice plants was eight-fold higher than that in wild-type rice plants. Salt tolerance assays followed by non-stress treatments showed that the transgenic plants overexpressing AgNHX1 could survive under conditions of 300 mM NaCl for 3 days while the wild-type rice plants could not. These results indicate that overexpression of the Na+/H+ antiporter gene in rice plants significantly improves their salt tolerance.

PMID: 12482579 [PubMed - indexed for MEDLINE]

1: Science 1999 Aug 20;285(5431):1256-8 Related Articles, Links

Entrez PubMed

Comment in:

- Science. 1999 Aug 20;285(5431):1222-3.

Salt tolerance conferred by overexpression of a vacuolar Na+/H+ antiport in Arabidopsis.

PubMed Services

Apse MP, Aharon GS, Snedden WA, Blumwald E.

Department of Botany, University of Toronto, 25 Willcocks Street, Toronto, Ontario M5S 3B2, Canada.

Agricultural productivity is severely affected by soil salinity. One possible mechanism by which plants could survive salt stress is to compartmentalize sodium ions away from the cytosol. Overexpression of a vacuolar Na+/H+ antiport from Arabidopsis thaliana in Arabidopsis plants promotes sustained growth and development in soil watered with up to 200 millimolar sodium chloride. This salinity tolerance was correlated with higher-than-normal levels of AtNHX1 transcripts, protein, and vacuolar Na+/H+ (sodium/proton) antiport activity. These results demonstrate the feasibility of engineering salt tolerance in plants.

PMID: 10455050 [PubMed - indexed for MEDLINE]

Related Resources